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SECTION OF THE ALLEGHANY MOUNTAIN, AND MOSHANNON VALLEY, IN CENTRE COUNTY, PENN.

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Philipsburg, Centre Co. Penn. March 15, 1832.

Dear Sir,—You ask for some information relative to the geology of this neighbourhood, and I lose no time in complying with your request. I believe I cannot do better than furnish you with the accompanying section, which I feel some satisfaction in doing, because its details result from a series of careful observations, made during last summer, whilst pursuing an exploring survey, to determine a rail-way route. I have preferred introducing a number of details into the section, rather than transfer them into a lengthened explanatory memoir. Until the investigation of the country bordering on the Alleghany chain be more extensively entered upon, I propose to occupy but a brief space in your Journal, with the requisite explanatory references.

My section illustrates only a very small portion of the central bituminous coal field of Pennsylvania; but it occurs in an interesting quarter, and it is well to make a beginning, where the area is so vast, and so little known to men of science. The direction of our course is north and south, exhibiting profiles of a part of the Moshannon valley, its creek, and some of its tributaries; and then crossing the Alleghany ridge or mountain, at the lowest depression we have been able to ascertain in this direction, we descend by Emigh's gap, and by the ravine and run

or rivulet called Emigh's, to Bald Eagle valley, and Little Bald Eagle creek. The levels have not been taken of this creek, and of the little Juniata, into which it falls, as far as the junction with the Pennsylvania canal, near Huntington; consequently, until those data be obtained, we cannot fix the precise elevation of the Alleghany ridge, with reference to that canal, and the sea.

Returning to Bald Eagle valley, at the southern extremity of our section, we will retrace, more in detail, the route I have rapidly sketched. Here we are deep enough to touch the limits of the mountain limestone, although the intervening Bald Eagle ridge separates us from the main body of that formation. Its course is S.W. parallel with the Alleghany chain, and its prevailing dip is E. or S. E. This inclination is inconsiderable at the distance of ten or fifteen miles from the outcrop, and at twenty miles from the Alleghany, I have observed its beds to be nearly horizontal. At the foot of the Bald Eagle, or Muncy ridge, they curve up to an angle as high as 60° to 75°, and occasionally may be noticed almost vertical, resting upon their edges.

Ascending the ravine, by Emigh's run, from little Bald Eagle creek, we arrive, in succession, at a variety of sandstone beds, upon which repose the coal measures, unless we view the entire series, as comprehended in the carboniferous formation. These lower beds may be estimated at about thirteen hundred feet, in their aggregate thickness. They are numerous, and as variable in structure, colour, and density, as rocks of this class generally are. Many of them contain casts of producta, spirifers, and unios; but the prevailing indication of fossils, is simply the hollow cavities formerly occupied by these shells. One of the most prominent of the lower beds, is a red, laminated, slightly micaceous sandstone, with subordinate seams of red clay and shale, which, after rains, give a red tinge to the surface waters, like those in the red sandstone districts of England. Their inclination is toward the W. and S. W. On some of the subordinate ridges, parallel with the Alleghany chain, and on that side nearest the limestone, the angle or dip of the slaty beds is sometimes as great as 60° to the west; that is, at right angles to the main ridge, and exactly contrary to the prevailing dip of the limestone.

Hereafter we hope to illustrate with greater precision, the posi-

tion of those vast disturbed masses, which constitute the singularly uniform ridges, and long straight valleys of central Pennsylvania, east of the Alleghanies; a subject on which the attention of a geologist would be fitly employed; which heretofore has remained unnoticed, and which involves some extremely interesting and extensive examples of displacement.

The progress of such an investigation is as slow as laborious, and the geologist contends with many natural difficulties. These will ever be found in a country like that under consideration, where the surface is obscured with a dense forest vegetation; where the operations of man have scarcely commenced; where neither artificial excavations, nor natural sections, nor exposed escarpments, relieve the monotony of the mountain side, or the gloomy ravine; and where those elevated valleys, ramifying amidst the intricacies of the mountain chains, have continued from remote ages, and in all probability, for ages will remain, an impenetrable wilderness, and an impracticable labyrinth.

On account, therefore, of these impediments to ordinary and individual examination, it is especially desirable, that geological observations, made under the advantageous circumstances attending public surveys, by engineers, and what is still better, of the completion of the works committed to their charge, and conducted at their leisure, should be faithfully recorded. This can be advantageously effected by communications with Geological Societies in the separate states, like that now coming into existence in Pennsylvania: but better still, upon the principle suggested at page 130 of your Journal, if conducted under the auspices of the government, as a branch of duty strictly in connexion with the engineer department. In this respect, your remarks are well deserving attention from the parties to whom they have reference; from those whose professional operations place them in situations so particularly favourable to scientific research, and more especially from the department whose province it is to direct their movements.

Reverting to our section, from which I have wandered, it will be obvious, that on approaching the summit of the Alleghany ridge, after intersecting the lower series to which I have referred, and estimated at upwards of 1300 feet in thickness, we arrive at a conglomerate rock or pudding-stone, composed of white quartz pebbles, set in a coarse grit. This bed

is fifty to one hundred feet thick. Large displaced fragments cover the surface, and have even been transported several miles in abundance, to the bottom of Bald Eagle valley, many hundred feet below. We occasionally see this breccia disintegrated, its pebbles occurring loosely, in the form of gravel, in extensive beds. In its compact state, this rock is sought for the purpose of fire or hearth-stone, for the neighbouring iron works. The position occupied by the conglomerate, is sometimes conspicuous, in its lofty site, at the distance of several miles; and in those cases, it appears as a bare and steep ledge, on the eastern slope of the Alleghany mountain; pursuing its course parallel with the summit, and commonly from one hundred to three hundred feet below the crest. In winter, when all other parts of the mountain are enveloped in snow, this dark ledge of gritstone is singularly discernible, forming the most striking exception to the general remark I have previously made. Its presence is no less distinguished by the change in vegetation, above the limits of this parallel. From the valleys, (which are occupied by hemlocks, white pines, and other dark evergreens,) white oaks, and some other deciduous trees, ascend upwards, to the base of the conglomerate, and are then succeeded by red, or pitch pines, whose dark foliage, and stunted forms, arise amidst a thick brushwood of chestnuts, forming those wild and worthless tracks, called barrens.* These upper strata consist of sand and beds of soft, white, porous, sandstone. The aggregate thickness of the beds above the limestone, up to this point, can scarcely be less than 1600 or 1800 feet. This estimate, of course, must be received as an approximation, the accuracy of which, is materially influenced by the inclination of the lower members of the series.

Descending from the sterile region above the conglomerate, we now perceive, in the sandstone which succeed, innumerable proofs that we have entered the limits of the great central coal-field. The first vein of bituminous coal is here discovered at an elevation, only one hundred and fifty feet below the crest of the

* It may be observed, that, in these mountainous regions, the season of winter and snow is, in some respects, particularly favourable to the display of its broader and most characteristic geological features, which are commonly obscured, at other times, by a luxuriant forest vegetation. At no time or place have I seen geological changes more distinctly indicated, or more influential on the character of the scenery, when viewed from great distances.

ridge we have just crossed. At present no coal has been extracted from this vein. Sixty feet lower, at Dale's farm, is a second, and larger vein, consisting of three seams, and comprising nine feet altogether, having two partings, of three inches each. The upper seam only, four feet thick, has hitherto been worked. At thirty-nine feet lower, is another large vein: and at least six other veins of coal occur, in descending to the level of the Moshannon creek, at Hoffman's dam. This is 324 feet further down, and at this point in our section, we have arrived at 575 feet below the Alleghany ridge, at its lowest part. These coal seams, and the subjacent strata of sandstone and fire clay, so far as we have been able to extend our observations, appear, with tolerable uniformity, to decline at a small angle towards the north, or rather the north-west.

It would be irksome to proceed with the details. Our profile exhibits the intersection of several other coal veins; but how many of them are distinct from those we have previously noticed, cannot readily be determined, as they have not all been proved or worked; and moreover, there is an obvious change of inclination. Those near Philipsburg, at the Beaver dam and neighbouring collieries, or coal banks, as they are locally termed, dip to the S. and S. W., to meet the more elevated beds and strata we have before mentioned, which incline to the N. and N. W. Some other veins, more to the northward than our section exhibits, crop out with a similar inclination to the S. W. along the banks of the Moshannon, extending toward its junction with the west branch of the Susquehanna. This inclination seldom forms a greater angle than one or two degrees, and affords great facilities for obtaining the coal. Fifteen miles westward of Philipsburg, and further within the interior of the basin, the coal veins incline to the E. and N. E., that is, toward the Alleghany chain, its apparent boundary.

Faults, if any occur, are rarely observable, within such a vast unexplored area. There is probably one of several feet, on or near the Beaver dams, as shown by the letters A and B on the section, the vein being the same at both points.

In regard to quality, there are variations in these veins, as I believe occurs in all coal basins; but here all are bituminous. The coal which is chiefly raised near Philipsburg, is in conside-

rable repute, and is conveyed, in some quantity, over the Alleghany mountain, to the iron works, eastward.

Fossils are not very abundant in the coal measures. Impressions of flags and reeds may be noticed in all the sandstones, even almost up to the western summit of the ridge; and ferns occur in the shales near the coal veins. Hollow cavities, formerly occupied with producta, and a few other species of cotemporary fossils, are occasionally to be seen in every part of the sandstone series, within the coal field.

THE BROWN LEAD ORE OF ZIMAPAN.

Communication from Professor Del Rio, on his discovery of a New Metal in the brown Lead Ore of Zimapan.

I should not again have brought forward my analysis of the brown lead ore of Zimapan, which now rather *redolet antiquitatem*, if the interest excited about the metal, called by some chemists in Europe, Vanadium,—after, as it is said, some Scandinavian mythological personage,—had not induced one of my friends to ask me to translate the passage concerning my analysis, from my Spanish translation of the mineralogical tables of Kersten, printed at Mexico in 1804, and which passage I here subjoin.

"Having distilled half an ounce of the brown lead ore three or four times with diluted sulphuric acid, and washed the residuum every time, I got a green solution, which, being saturated with excess of ammonia, gave, in a few days, crystalline crusts formed by needles on the surface of the liquid, or stars, composed of very acute pyramids, on the sides of the cup. These white crystals being washed with some water and dried in the air, became a most beautiful scarlet red as soon as they were touched by a single drop of an acid somewhat concentrated. When diluted, they became at first yellow, and afterwards red. These acids* dissolved them without decomposition. I experienced the same with potash, soda, and lime, excepting that the rhombohedrons of potash only became yellow. The excess of ammonia being saturated with nitric acid, and concentrating it somewhat by evaporation, I got square prisms, pointed, with four faces upon the edges, of a pretty aurora red, the taste of which was pungent and metallic. The same was done with soda, and I got squares of a red colour, and oblique sided ones with potash, and of a yellow colour.

"Having put in a porcelain test below the muffle, 17.75 grains of the

* As far as I remember they were the sulphuric and nitric.—*A. D. Rio.*

needles formed by ammonia, they became a most beautiful red without losing their form, and they melted afterwards into an opaque mass, between liver-brown and lead grey, with very fine stars on the surface, of a semi-metallic lustre, its weight 11.75 gr. I put it into the forge in a small crucible with charcoal, for an hour and a half; the mass became only black with charcoal, and the increase of weight was 1.25 gr. I put it into a small retort with nitric acid, red vapours were formed at last, and the matter was red. I repeated the same twice, and I augmented the fire in the end, to disengage all the nitric acid: on pouring some water on it, it became emulsive or milky. The emulsion being cleared off at length, it did not redden the tincture of radish, though it precipitated, with a yellow colour, the solutions of nitrate of silver, mercury and lead: it precipitated also prussiate of lime of an emerald green, and tincture of galls of a blackish green. The olive green sediment became immediately red with some nitric acid, and the yellow solution with zinc and iron gave a green oxide.

"By the blow pipe the glass became grass green. I could not amalgamate with mercury its combination with ammonia. [Other experiments which I made at the time were not inserted in my translation.]

"The proportion then of the constituent parts of the brown lead ore, are 80.72 of yellow oxide of lead, and 14.80 of the new substance, the rest being a little arsenic, oxide of iron, and muriatic acid.

"*Presuming that it was a new substance*, I called it *Pancrome*, on account of the universality of the colours of the oxides, solutions, salts, and precipitates: and afterwards *Eritrone*, on account of its singular property of forming with the alkalies and the earths, salts which became red at the fire, and with acids; but *being informed that the chrome gives by evaporation red and yellow salts*, I believe that the brown lead ore is a yellow oxide of chrome, combined with an excess of yellow oxide of lead."

Slight deviations sometimes occasion great inconveniences. If the justly celebrated Baron Humboldt, to whom, when in Mexico in 1803, I gave a French copy of the preceding experiments, had thought them worthy of publication, they would have excited, doubtless, the curiosity of European chemists, and of Descotils himself, who had more knowledge than myself of the properties of chrome; *so that thirty years would not have elapsed before the new metal was acknowledged.* Humboldt, apparently, did not think so; because, as I have said somewhere else, European monopolists have not always appeared solicitous to sustain the merit of discoveries effected in the Americas.

I am quite astonished to hear that Kersten has analysed the brown lead ore of Poullaouen and found it to be phosphate of lead. I determined that of Zimapan to be brown lead ore, only by its external characters, which were entirely identical with those

of the lead ore of Poullaouen in Brittany, and of Hodristsch in Hungary; so that if this last is a phosphate also, we must conclude that they are the opposite of the isomerous bodies. Who can rely now on crystals being the basis of a mineralogical system?

A. Del Rio.

REMARKS.

We venture, for the third time, to call upon European chemists to do justice to Professor Del Rio, whose just claims, up to the present moment, have been remarkably overlooked. That the nature of those claims may not be misapprehended, we shall briefly state them, confining our observations strictly to the facts which have occurred. We feel it necessary to do so, since we perceive that the merit of Professor Del Rio's discovery of the new metal in question, is becoming more and more obscured, by the slight weight which has been attached to it by names of great eminence, and especially by the powerful name of Berzelius. The evidence of this is very abundant, but we shall go no further on the present occasion than to the pages of Dr. Brewster, and to those of the Philosophical Magazine and Annals of Philosophy, on the new metal, called Vanadium, in Europe.

In the July number for 1831, of the Edinburgh Journal of Science, Mr. James F. W. Johnson has the following passage:

"It is a remarkable circumstance, and illustrative at once of the wide diffusion of chemical knowledge, and of the progress of scientific chemistry, that the new metal *Vanadium* has been discovered in three different countries nearly at the same time, and without any communication between the several individuals by whom it has been observed and detected. First in order of time, Professor Del Rio, of the school of Mines of Mexico, detected a new metallic substance in the brown lead ore of Zimapan, to which, probably from its forming red salts, he gave the name of Erythronium. *His results were not published* however, M. Collet Descotils, to whom specimens were transmitted, having pronounced it to be an impure chromium. Meantime Professor Sefström, of the School of Mines at Fahlun in Sweden, detected in an ore of Iron, a simple metallic body, which he named Vanadium, and of which he announced some of the properties about the end of the past year. The metal of Del Rio, it now appears, is the same with that of Sefström."

We take the following passage from the Philosophical Magazine for November, 1831:

"*On Vanadium.* By M. Berzelius. Vanadium was discovered in the year 1830 by Sefström, in a Swedish iron, remarkable for its ductility, obtained from the iron mine of Jaberg, not far from Jönköping in Sweden.

The name of this metal is derived from that of Vanadis, a Scandinavian divinity. It is not yet known under what form, or in what state of combination, vanadium occurs in the ore of Jaberg. It is also found in Mexico, in a lead mine at Zimapan. Del Rio, who analysed it in 1801, announced the discovery of a new metal in it, which he called Erythronium; but the same mineral having soon afterwards been analysed by Collet Descotils, he asserted that Erythronium was merely impure chromium. Del Rio himself adopted the opinion of the French chemist, and considered the mineral as a subchromate of lead; thus the metal, so near being discovered, remained thirty years unknown to chemists. Since the discovery of Vanadium by Seftström, Wohler has ascertained that the mineral of Zimapan contains vanadic and not chromic acid."

Our readers will observe, that in both these passages Del Rio's prior discovery of the new metal is admitted. Yet Berzelius, who says expressly, "*Del Rio, who analysed this mineral in* 1801, *announced the discovery of a new metal in it*," most inconsistently asserts that "*Vanadium was discovered, in the year* 1830, *by Sefstrom.*" Mr. Johnston, who no doubt is disposed to be just, appears to have written without proper information respecting the history of this metal; for he says, that it "has been discovered in three different countries *nearly at the same time;*" and further on, speaking of Del Rio's discovery, he says "*his results were not published.*" Words have very absorbent powers, and time and space will have very little chance with them, if "*nearly at the same time*" can shut up, like an opera glass, all the interval between 1801 and 1830. As to the non-publication of Del Rio's results, we refer Mr. Johnston to this eminent chemist's translation of Kersten's Mineralogical Tables, p. 61, printed at Mexico, 1804, where he will find the original of the passage of which Professor Del Rio has sent us an English translation, with the preceding communication.

We proceed now to state why Del Rio was induced to assent to the opinion of Descotils, and apparently to abandon his discovery.

He had, as Berzelius truly says, made the discovery of this new metal, previous to the arrival of Humboldt in Mexico, in 1803. They had been fellow students together at Freyberg, in Saxony, at the great school of Werner, where some of the most celebrated analysts acquired the first rudiments of mineralogical knowledge. Humboldt's arrival in Mexico was preceded by the brilliant reputation he had acquired. He was considered,

to use very plain words, *to be up to every thing*, and to be quite *au fait*, respecting the experiments of Vauquelin and Descotils, concerning the metallic nature and properties of chrome. He found Del Rio far removed from Europe, almost without any kindred minds to assist or encourage him, diffident as his character always has been, and disposed, by many prepossessions, to pay much deference to the opinions of Humboldt. To him Del Rio communicated his discovery, *and gave him a copy in the French language*, of his experiments, as they were subsequently published in his translation of Kersten. Humboldt, however, informed him that chrome gave by evaporation, red and yellow salts, and induced him to suppose that the phenomena he had observed, were due to the action of chromic acid. Confiding in the superior information of his friend, he accordingly, with great modesty, forbore to press his own opinions; and in 1804, in his translation of Kersten, submitted that it should be thought a sub-chromate of lead. Descotils himself, sometime after, expressed the same opinion; a circumstance which took from Del Rio every inducement to revive the subject, which remained buried in error, until Sefström discovered the same substance, in 1830, in iron, in Sweden. Mr. Johnston discovered it in Scotland, in the winter of the same year. In the meantime, subsequent to Sefström's discovery, Wohler re-examined the brown lead ore of Zimapan, and found that it was not a sub-chromate, but that it contained a new metal; that Del Rio had been perfectly right from the first, and that Sefström had merely reproduced in 1830, what Del Rio had discovered in 1801.

Now we would contend, that under these circumstances, any man who attempts to wrest this trophy from Del Rio, is altogether unjust, and that he alone is entitled to wear it. In matters of this kind, the motto "qui meruit, ferat," is of universal application. It certainly cannot be asserted by European chemists, that Del Rio is not entitled to the honours of his own discovery, because he has not done all he might have done, to vindicate his own claim to them. The fair way of considering the matter, is, that his discovery would never have been disputed, if Baron Humboldt, coming to America as a sort of legate *in partibus*, on the part of European science, had not misled him, whose only fault has been a diffidence in his own superior attainments. Baron Humboldt, of whom we always wish to

speak with the respect due to so distinguished a philosopher, has not, as the case now stands, been just to his friend Del Rio; and it is evident that more is felt on this subject, than has been expressed. Why did not Baron Humboldt publish the analysis, of which he received a copy from Del Rio, in 1804? Certainly it was not given to him to suppress; and he must have known that the Spanish translation of Kersten was made for Mexico, and not for Europe, where, perhaps, there are very few copies. At any rate, it appears not to be common, since Mr. Johnston has not seen it. We think the chemists of the present day, must see that Del Rio was a very able analyst at that time, and had Humboldt published it, or transmitted it to Europe, it could not, as Del Rio states, have failed to excite the curiosity of those who have paid particular attention to the combinations of chrome: they would have examined it with attention, and the result would have been, long ago, a universal acknowledgment of the new metal, and of Del Rio, as the discoverer of it. We wish that Baron Humboldt, when he stated in Paris, in February 1831, the principal facts in the history of this metal, as they have been stated in the passages we have given from Berzelius and Mr. Johnston, had also stated *the reasons* which had induced Del Rio to suppose it not a new substance, but an impure chrome. He had an excellent opportunity to do so, which, if he had availed himself of, we should probably not have felt ourselves called upon to dissuade European chemists from naming a new metal,—not discovered by themselves, but by a Mexican,—after a ridiculous Scandinavian deity that never had any real existence. If the progress in knowledge is of the right kind, if there is nothing deceptive in the extraordinary and very active demonstrations in the pursuit of science in Europe, then those whom it concerns to give proofs that they have learnt how to stand up voluntarily for truth and justice, will be just, upon this occasion, to America; and will, as we hope, and have before suggested, restore Del Rio to his rights, by calling the metal discovered by him *Rionium;* a name which, we think, Mr. Johnston will agree with us, will be found quite as *manageable* as vanadium.

We have every disposition to defer to the learned chemists and mineralogists of Europe, and gratefully and eagerly receive the numerous contributions which science is constantly owing to them. We believe that the tree of knowledge flourishes most,

where the love of justice is strong: various as are the blossoms of that tree, they produce but one fruit, truth; which is to justice, what the pericarp of the cherimoyer among the anonaceæ, is to its seed. If we would have truth, we must plant justice. Had Del Rio been in Europe, this matter would have been properly arranged long ago. The smallest innovation there, upon a pre-emption right in the metacarp of even a coleopteral, will set a whole *Versammlung* in arms, and produce a hundred pages of sur-rejoinders, at least. Let it be an additional motive to those to whom we now appeal for justice, that, as the face of nature seems to smile, when the setting sun breaks through a troubled sky, so it would cheer the declining days—which are not sunny ones—of the venerable Del Rio, to learn that men have done that justice to his name, which fortune has never done to his merits.

ATOMIC WEIGHT OF MERCURY.

Mr. Editor,—Your correspondent, A. B. H. will find a solution of his inquiries, respecting the atomic weight of mercury, in a recent work of Dr. Thompson's, viz. "Chemistry of Inorganic Bodies." As the book has but just come from the author's hands, and probably will not be reprinted in this country, it may be worth while to extract such parts of it as relate to the matter in question. It ought to be premised, that as Dr. T. adopts oxygen for his unit, his atomic numbers must be multiplied by eight, to reduce them to a hydrogen basis.

"In many cases it is not easy to fix upon the true number denoting the atomic weight of a body. We can always infer, that the weight of one body that enters into combination with another, either denotes the atomic weight of the body, or at least a multiple, or sub-multiple of that weight; but, in some cases, it may be very difficult to determine which of the three. Thus, for example, we have two compounds of mercury and oxygen, the constituents of which by weight are as follows:—

Black oxide,	Merc. 25 + 1 Oxy.
Red oxide,	" 25 + 2 "

"We might consider the atoms of mercury to be 25. On that supposition, the black oxide would be a compound of 1 atom mercury plus 1 atom oxygen; and the red oxide of 1 atom mercury plus 2 atoms oxygen.

"But we might also consider the atom of mercury as only 12.5 or the half of 25. In that case, the red oxide would be a compound of one atom of mercury and one atom of oxygen, and the black oxide of two atoms of mercury, and one atom of oxygen. There is nothing in these compounds that can determine which of these views is the right one. Both oxides are capable of combining with acids, and of forming salts. The red oxide is the most permanent and intimate combination, but the black is always first formed when we attempt to combine mercury with oxygen. In such cases as this we are left to conjecture or analogy to assist us in deciding what number should be taken to denote the true atomic weight of the body. We see that the atom of mercury weighs either 25, or the half of 25, but which of the two, it might, in the present state of our knowledge, be impossible to determine. In such a case, we may be allowed to refer to analogy, to enable us to decide the point. It was first observed by Dulong and Petit, that when the atomic weight of a body is multiplied into its specific heat, the product is a constant quantity. And I have shown, in my treatise on Heat, that this product is always 0.376. Therefore, if we divide .376 by the number denoting the specific heat of mercury, the quotient should be the atomic weight of that body. But the specific heat of mercury is .03 and $.376 \div .03 = 12.52$. This circumstance furnishes a reason for considering the true atomic weight of mercury to be 12.5."—*Vol.* 1, *p.* 9.

"The specific gravity of the vapour of mercury, as determined by Dumas, is 6.976. From this determination, which must be very near the truth, it follows as a consequence, that the atomic weight of mercury is 12.5. For the atomic weight of a gaseous body multiplied by .5555, is equal to the specific gravity in the gaseous state. Now $12.5 \times .5555 = 6.9747$ a number which almost coincides with that found by Dumas."—*Vol.* 1, *p.* 612.

"I have shown (Ann. of Phil. 2d series, ii. 126,) by experiments which I consider as decisive, that the real atomic weight of mercury is 12.5."—*Vol.* 1, *p.* 615.

If the arguments* advanced by Mr. Allinson, are added to

Which are briefly these: the protoxide of mercury is decomposed more readily than the deutoxide; the protochloride than the deutochloride, &c: these facts contravene the universal law, that compounds (of elements) consisting of one atom of each constituent are less easily decomposed than those consisting of one and two. Hence, there is a strong probability that what is called the deutoxide is, in reality, the protoxide, &c

those above given, there can be no reasonable doubt left but that the true atomic weight of mercury is 100; (hydrogen basis;) and although these would not of themselves be sufficient to establish this fact, yet Mr. A. is fairly entitled to the credit of having shown that to be highly probable, which Dr. Thompson's investigations have rendered certain.—Very respectfully, yours,

J. B.

New York, February 38th, 1832.

ARVICOLA NUTTALLI.

Description of a new species of quadruped of the genus ARVICOLA, of Lacepede, or HYPUDŒUS, of Illiger.—By R. HARLAN, M. D.

ARVICOLA *Nuttalli.*—Fawn-coloured above, whitish beneath; ears long and hairy; toes sparsely hairy; tail nearly the length of the body.

Dimensions.—Length of the body three inches, of the tail, two and a half inches.

Habitat.—Southern States.

Description.—Crowns of the molars similar in the arrangement of the enamel to those of the type of the genus, as represented by F. Cuvier—"Dents des mammiferes;" but the roots are mostly cleft into four prongs: the inner surface of the inferior incisors, grooved longitudinally; ears very large, hairy within and without; legs small and weak, sparsely hairy; fore feet with four toes, armed with hooked nails; thumb rudimentary, with a flat nail; hind feet with five toes, armed with hooked nails, all with sparse hairs extending to the roots of the nails; a callous tubercle at the inferior base of each finger, and two others on the wrist; tail long, cylindrical, and sparsely hairy; eyes large, black, and prominent. General colour of the body above, plumbeous, each hair being tipped with brownish yellow, presenting a fawn-coloured surface; beneath white. Whiskers composed of very long, fine, black and white hairs.

Like the musk-rat, (ONDATRA, Lacep. or FIBER, Cuv.) this quadruped differs from the arvicola principally in the possession of roots to the molar teeth; but for the existence of these roots,

in the former, M. F. Cuvier remarks, that he would consider the genus as merely forming a third division of arvicola: we doubt if the existence of a single character of this nature, should indicate even a specific distinction.

The specimen under consideration is a young male, just full grown; in colour it displays a striking resemblance to the GERBILLUS *canadensis;* it was recently taken in Virginia, by Mr. Nuttall, (the eminent botanist,) in the vicinity of Norfolk, near the river shore, and was one of several he discovered under the bark of a hollow tree, where they had built a fine nest.

M'MURTRIE'S TRANSLATION OF THE "REGNE ANIMAL."

Sir,—That a translation should be undertaken and published in the United States, of so elaborate a work as *Cuvier's Regne Animal*, at a time, too, when the English language, at its head quarters, is acquiring another, from the united labours of Mr. Griffith and his co-adjutors, argues a great deal for the apparent advances we are making in the study of natural history. It was a spirited undertaking on the part of the publishers, and deserves success. I confess, I had supposed the limited number of persons amongst us who might wish to possess an English translation of the Regne Animal, was far short of the encouragement such a work requires: in this I find I was mistaken; for whether the translation has been executed well or ill, the appearance of the work is sufficient evidence of the confidence of the publishers in the demand for it. The remarks I am about to make, have not been suggested by the habit of critical severity, nor by hostile feelings to any one. I hope to show that it is the love of science which guides my pen, as well as a desire to vindicate the literary reputation of the country. It will be doing something towards that, if one American corrects the errors into which another has fallen.

I also wish to show the publishers of this country, how much it is their interest, when they are about to publish translations of foreign scientific works, to employ competent persons. It is a wretched economy, both for publishers and purchasers, to have any thing to do with translations, merely because they can be procured at a cheap rate; any man capable of giving a correct

version of a scientific work, extending to 2000 pages, deserves to be well paid for his labour; for knowledge of that various kind, is procured by long application and much expense.

The first duty of a translator is, to give the meaning of his author; and to do this, he must thoroughly understand the subject of which his author treats.

Let us see how Dr. M'Murtrie's translation conforms to this rule.—Vol. I. page 18, of preface to the first edition, we have,—"In the mammalia I have brought back the solipedes to the Pachydermata, and have divided the latter into families upon a new plan; the ruminantia I have placed *after* the quadrupeds, and the sea cow near the cetacea." Here the camel, the deer, the goat, the sheep, the ox, all these important ruminating animals being placed *after* the quadrupeds, of course are not included in them. What is then to become of them—are they to be considered as annihilated, by the readers of this translation? Cuvier says, "Dans la classe des mammiféres, j' ai ramené les solipedes aux pachydermes; j' ai divise ceux-ci en familles d' aprés de nouvelles vues; j' ai rejeté les ruminants à la fin des quadrupedes, j' ai placé le lamantin prés des cetacés." Now previous writers had placed the sea-cow, (*manatus*, or *lamantin*,) morse, &c. among the quadrupeds; but as the sea-cow, &c. although warm-blooded animals, and chewing the cud, possess but two extremities in the form of anterior fins, Cuvier very properly separated them from the ruminating quadrupeds, and placed them at the head of the whales, to form the first division, or the cetacea herbivora. Dr. M'Murtrie would have spared some confusion to the young student in zoology, if he had said, "I have rejected the ruminants, which were at the end of the quadrupeds, and have approximated the sea-cow to the cetacea."

At page 12, line 28, we have, "Vegetables derive their nourishment from the *sun*, and from the circumfluent atmosphere in the form of water, &c." Cuvier says, "*Le sol* et l'atmosphére presentent aux vegetaux, pour leur nutrition, de l' eau, &c." It does not appear to have occurred to this *naturalist*, that the *soil*, which is the obvious meaning of the word *sol*, has any thing to do with the nourishment of plants. Griffith, in his translation of this passage, makes precisely the same mistake. If it will be any comfort to Dr. M'Murtrie, I can truly tell him, that my copy of Griffith is scored with worse blunders than this: I will instance

one of them. Cuvier, at page 15, of his introduction,* says, "Tous les êtres organisés produisent leur semblables; autrement la mort étant une suite necessairè de la vie, leurs especes ne pourroient subsister;"—which he has rendered, "All organized beings produce their like, *otherwise death would be a necessary consequence of life, and the species must become extinct;*"—than which, nothing can be more absurd. The true version is, "*All organized beings produce their like; if it were not so, death, being a necessary consequence of life, their species would become extinct.*" Dr. M'Murtrie's translation consists but of four volumes, and is to be preferred, on this account; for there is no end to the production of the other, which has already reached the thirty-first number, and upwards of 6000 pages. This work will eventually be swelled out to forty numbers, containing at least 8000 pages, and will cost the subscribers, in this country, one hundred and thirty dollars. But this cannot be fairly called a translation of Cuvier; the supplements and notes of the translator and his coadjutors, have increased the bulk of the work beyond all expectation, and have turned Griffith's version of the Regne Animal, into a job of an indecent length, and an exorbitant expense, for which the work by no means compensates in its intrinsic value; the translation being frequently very carelessly and blunderingly executed; the original matter often very erroneous; and the engravings, many of which are beautifully executed, especially those of the genus cervus and felis, being superfluously expensive; many genera not having a single species given, whilst in other instances, numerous figures are given of the same species. The errors in the supplementary matter are not only numerous, but often brought forward ex cathedrâ, as if they were the ne plus ultra of observation in the anatomy, physiology, and habits of animals. At page 32, Reptilia, part 1, he says "poisonous snakes are harmless to their own kind," which is inconsistent with observation; for the poison of the rattle snake is not only fatal to its kind, but to itself, when accidentally self-wounded. At page 40, he says, the intestines of the tadpole are "destined to digest vegetable nutriment;" when we know the tadpole feeds on animal food; for there is no better method of cleaning the skeletons of small animals, than by employing tadpoles.† But it is useless further to multiply instances;

* Regne Animal, Vol. I. Paris 8vo. 1829. † Vide p. 239, Month. Am. Jour. of Geol.

they are any thing but creditable to the persons engaged in the work.

But to return to Dr. M'Murtrie, who, in the very next page to his blunder about the sun, has the following passage:— "The relations of vegetables and animals to the surrounding atmosphere, are therefore in an inverse ratio—the former *reject water* and carbonic acid, while the latter produce them." As there is not a tyro in the elementary lessons of chemistry, who will not be puzzled at this singular statement, which may reasonably discourage any one from looking any further into this translation, I feel called upon, by a sense of what is due to Cuvier, and to the reputation of this country for more correct knowledge, to expose what seems to have grown out of pure ignorance, both of the language and the subject. Cuvier, in a beautiful passage, is treating of the mutual action of the vegetable and animal systems, for the preservation of each. He states, that the soil and the atmosphere, present to plants for their nourishment, water, and air; that the first is composed of oxygen and hydrogen, the second of oxygen, azote, and carbonic acid, which itself is a combination of oxygen and carbon: that plants select from all these, hydrogen and carbon, for their own composition, and reject the superfluous oxygen, by the aid of light. That animals, besides these elements, devour organized bodies, of which hydrogen and carbon form the principal parts; thus, whilst animals retain azote, they reject the superfluous hydrogen and carbon, by means of respiration; and this is accomplished in the following manner. The oxygen of the atmosphere combines with the superfluous hydrogen and the carbon of their blood, becoming in the first instance water, in the second carbonic acid." He then proceeds to say, "that the relations of vegetables and animals with the atmosphere are inverse; the first decomposing (defont) water and carbonic acid, the second reproducing them." Dr. M'Murtrie has ignorantly reversed the whole arrangement of nature, by stating that vegetables *reject water.*

Cuvier had stated that medullary matter appeared to the eye like a soft boiled pulpy substance, (de bouillie molle) where nothing but globules *infinitely small* could be discovered. Dr. M'Murtrie, at page 14, says, "it appears like a sort of *soft bouillie,* consisting of excessively small globules." This is not English.

The word bouillie, it is true, has made a sort of lodgment with us, as a representative of boiled beef; but we hardly think his readers will be much edified by learning that the molecules of the spinal marrow resemble *excessively small* pieces of boiled beef. To translate "infiniment petits," by "excessively small," is to throw away the whole philosophic force of the passage.

At page 31, is another instance of unfaithful translation, and want of knowledge in the physiology of invertebrated animals. Of these he says, "the muscles are merely attached to the skin, which constitutes *a soft contractile envelope*, in which, in many species, are formed stony plates, called shells, whose position and production are analogous to those of the *mucous body*." Cuvier says, "les muscles sont attachés seulement à la peau, qui forme une enveloppe molle, *contractile en divers sens*, dans laquelle s'engendrent, en beaucoup d'especes, des plaques pierreuses, appeleés coquilles, dont la position et la production sont analogues à celles du corps muqueux." A competent translator would have translated the phrase "contractile en divers sens;" for these lights and shades of great masters, are sacred in the eyes of men of science; and a physiologist would have said, "are analogous to those of the rete mucosum," the position of which, between the epidermis and cutis vera, is clearly expressed by Cuvier.

As a specimen of errors attributable to sheer carelessness, we have, at page 49, the following strange assertion, under the head of "physical and moral developement of man," and which has hitherto been supposed only applicable to that eccentric sect of the bimana, called Shaking Quakers. Speaking of the external marks of puberty in young persons, Dr. M'Murtrie says,—for Cuvier does not say so—"and neither sex, (very rarely at least,) is productive, before, *or after* that manifestation."

At page 143, speaking of the rat, mus rattus of Linnæus, we have, "of which no mention is made by the ancients, and which appears to have entered Europe *in the middle century*." Cuvier says, "dans le moyen age," "in the middle ages." In the name of old Chronos, what does the middle century mean?

Few persons in this country have seen the giraffe, and books must be relied upon, of course, for a general knowledge of the structure of this interesting animal. Dr. M'Murtrie, at page 186, Vol. I, in treating of the horny prominences on the heads of many of the ruminants, says, "In others, the prominences are only

covered with a hairy skin, continuous with that of the head; nor do the prominences fall, *those of the giraffe excepted.*" Cuvier says, "la seule giraffe en a de telles," "*the giraffe alone has such prominences*:" i. e. with a hairy skin, and which never fall. Here the translator has stated precisely the reverse of what his author says.

Whatever opinion Dr. M'Murtrie may entertain of his own qualifications as a translator for such a work as Cuvier's Regne Animal, I will do him the justice to suppose, he would not deem any other individual capable of so important an undertaking, who could commit the errors I have animadverted upon. It would be deemed a bold thing of any man now living, in a translation of Cuvier's work, to make important changes in the nomenclature, to suppress it in some instances, and to frequently impute to this great naturalist, "*this is a mistake.*" Dr. M'Murtrie has felt confidence enough in himself to do all these things. There are, it is true, a few blemishes in Cuvier's work, as there are spots in the sun; but the important ones have, for some reason or other, escaped the vigilance of his translator. Speaking of the suricats, (*ryzæna* Iliger,) Cuvier says, at page 158, 8vo. edition, 1829, Vol. I, "they are distinguished from the mangousts and from all the carnivorous animals which have hitherto been spoken of, *because they have only four toes to each foot*," forgetting that he had just before, at page 154, said, "the hyena may be placed after the dogs, as a fourth sub-genus, distinguished by the number of its toes, *which is four to every foot.*" This error we find translated, without remark from Dr. M'Murtrie.

The third order of the mammalia, is called by Cuvier *carnassiers*, from their being addicted to flesh. This order was formerly called carnivora; but as some animals are merely addicted to flesh, whilst others are voracious after flesh, Cuvier has transferred the term carnivora to these last. Dr. M'Murtrie has substituted carnaria for carnassiers, without giving his reasons, and without apparently considering, whether there is any essential difference between the meaning of the two words, carnaria and carnivora. It was the duty of such a translator to have left matters as he found them. In other instances this translator has totally omitted important terms, apparently because he could not make them bend to his classical powers; this is a source of serious inconvenience to his readers, who are thus obliged to re-

fer to the original text, to know what species are under consideration: thus, at page 292, not knowing what to make of "les mesanges," (titmouse or tom-tit,) he has omitted it altogether, although in the original it stands at the head of several of the species, whose descriptions follow; and indeed, when he comes to translate those descriptions, we find the following references: "la M. à téte bleue. Le M. huppé. Le M. à longue queue;" whilst it is impossible for students to know what the letter M refers to, because the generic term *mesanges* is entirely omitted.

At page 373, is another monstrous blunder: speaking of the family cultirostres, he says, "we subdivide it into three tribes; the cranes, the true herons, *and the swans.*" And he then proceeds to describe the grus, or crane; the cancroma, or herons, and—the swans of course—no, he describes the ciconia, or storks; and without perceiving his previous error: this, too, from a Latinist, who draws distinctions between carnaria and carnivora. We must remark, here, that if the translator had understood the French or Latin languages, he never would have translated cicognes, (ciconia, storks,) into swans; and if he had had but a sprinkling of knowledge of the subject, he would have known that swans belong to the great duck genus, (anas L.) which his author has placed in the family lamellirostres, and not in that of cultirostres.

At the end of the first volume, we find an "Appendix, by the American Editor," of which much cannot be said in favour: it is very imperfect, and fails, in numerous cases, to establish specific distinctions. The worst feature of this appendix is the reiteration of species previously described under different names, and by naturalists, whose labours have been, in other instances, overlooked or neglected. The *vespertilio lucifugus*, of Le Conte, is the *v. subulatus* of Say. See Long's Expedition to the Rocky Mountains, Vol. II. p. 62. The *v. noctivagans* of the same naturalist, is not sufficiently characterized, and its habitat not mentioned. The plecotus macrotis of L. C. is most probably the megalotis of Rafinesque. The *nycteris noveboracensis*, is quoted as figured in Wils. Orn. vi. pl. 4; and the translator adds, "whence it has been quoted by M. Cuvier as the *taphizous.*" I venture to assert that this may be classed among the numerous inconsiderate insinuations of this work, and that Cuvier is entirely correct in this reference of the taphizous from Wilson.

At paragraph vi., the two wolves described by Say, in Long's Expedition, *canis latrans*, and *c. nubilus*, are stated to be probably varieties of *c. lupus*. A visit to the Philadelphia museum, where individuals of these two species are preserved, would have satisfied him of Mr. Say's correctness. Indeed, *c. nubilus* resembles *c. lycaon*, more than *c. lupus*.

The catalogue of the "mammalia and birds of the United States," which closes the first volume, is exceedingly defective, and exhibits an almost entire ignorance of the labours of American naturalists. The genus sorex is mentioned, with the following note: "We have many species of this genus in the U. States, but not one that has yet been properly determined." And at page 88, there is a note on this subject, signed *Am. Ed.* which has a very learned appearance. Who the friend behind the curtain is, I do not pretend to say; but it has occasionally been drawn up high enough to show, at least, the legs of a friend. Whether intentionally or not, Mr. Say is treated with great injustice. More complete descriptions of an animal have never been given, than those we owe to him of the *sorex parvus*, and sorex brevicaudus, for which I refer to Long's Expedition, Vol. I. pp. 163, 164. Traits of this kind deserve animadversion. It is not to be endured, that the labours of so distinguished a traveller as Col. Long, and of so able a naturalist as Mr. Say, should be obscured in this unjustifiable manner. Of the illiberal slights which other American naturalists have received upon this occasion, I forbear at present to speak.

The translator has not thought proper, at the end of his first volume, to give a list of errata: this he ought to have done, since they are numerous enough, and occasionally affect the meaning of his author; the typographical errors, too, are sufficiently obvious to catch the eye of a rapid reader. At page 29, *honogeneous* for *homogeneous*,—p. 69, *siamiri* for *saimiri*,—p. 72, *every* for *very*,—p. 80, *shaved* for *shaped*,—p. 111, colour *on* the eye, for *to* the eye,—p. 113, *black* for *back*,—p. 126, *black* for *back*,—p. 139, *watered* for *waved*,—p. 142, *poessig* for *poeppig*,—p. 238, *morhpnus* for *morphnus*,—p. 258, *tanaers* for *tangara*,—p. 277, *mœura* for *mœnura*,—p. 297, *maugeur* for *mangeur*,—p. 331, *birds passage* for *birds of passage*,—p. 347, *larger* for *longer*,—p. 392, *roges* for *rouges*,—p. 402, *beak* for *neck*,—p. 405, *when* for *where*.

I shall not pursue, at present, these remarks into the subse-

quent volumes. If the publishers are men of sense, they will be obliged to me for enabling them to render a future edition of their work more deserving the patronage of the public. It has had its share of puffing in the newspapers, and it is now the turn of purchasers of the work, of which I am one, to speak of it as they have found it. I have taken the trouble to do so, out of pure regard for the reputation of the country; nor should I have drawn up these observations, if I had not believed, from the independent and correct course you have hitherto pursued in your Journal, that I might reasonably expect them to be inserted in it. I consider your Journal as a scientific periodical, not infected by the spirit of puffing and quackery, and independently and intelligently standing up for the true interests of science, and the scientific reputation of the country. I regret that I am not able to give this honest praise to Mr. Silliman's American Journal of Science and Arts, which certainly, upon this occasion, has not deserved it; having voluntarily lowered itself to the level of common puffers, by announcing Dr. M'Murtrie's translation in the most eulogistic terms, "as very faithful and able." I perceive that the publishers of Dr. M'Murtrie's work, have appended to their advertisements this recommendatory certificate of Professor Silliman. The principal effect of this wretched puff, will be to strengthen the increasing want of confidence in its author. In one sense, it may serve the purposes of the publisher; for the public, puzzled by such different accounts of the work, may purchase, and in order to judge for itself, may read the work. I wish it may occur also to Professor Silliman, to look into the work; as I cannot but infer, he has never read a line in it. I give you his passage.

"Dr. M'Murtrie is entitled to the thanks of the cultivators of natural history, for *his very faithful and able translation* of this most perfect system of zoology. The publication of the present work, we are confident, will form an era in this country."—*Silliman's Journal, Vol.* XXI, *p.* 388.

Taking it for granted that you will examine into the truth of my averments, I place it with cheerful confidence in your hands, reserving my remarks upon the subsequent volumes, which are by no means without merit, for a future occasion.

A Subscriber.

We have had the preceding communication sometime in our possession, and publish it with reluctance, although we have

verified, by personal examination, the accuracy of "A Subscriber," in relation to the errors and omissions it adverts to. Much praise is due to those through whose enterprise this translation has been undertaken; and every naturalist is aware, that a translation of the Regne Animal is a very arduous undertaking; one that could scarce be completed without some deficiencies. It appears to us, to have been sent to the press with too much haste, and that if the translator had required of some intelligent friend, to revise it before it was printed, he would have been spared these remarks, which will perhaps give him pain. The greater portion of the work is well done, and bears testimony both to the intelligence and industry of the translator. We feel exceedingly, that we cannot accord to it all the praise, we had hoped it would deserve at our hands; but justice must be done, and we shall never shrink at the performance of any act, by which the cause of science may be substantially advanced. We think that the remarks of "A Subscriber" will be permanently beneficial, both to the public, and to the parties themselves.

EDITOR.

AUDUBON,

Author of "THE BIRDS OF AMERICA," and "ORNITHOLOGICAL BIOGRAPHY."

JOHN JAMES AUDUBON, of French descent, was born in the State of Louisiana:—but as no words can tell his early history so eloquently as his own, we shall proceed to select such passages from the "Introductory Address," to his Ornithological Biography, as cannot fail to excite in our readers, a deep interest for the writer of this most interesting, but too short auto-biographical sketch. After calling himself an "American woodsman," he proceeds:

"I received life and light in the New World. When I had hardly yet learned to walk, and to articulate those first words always so endearing to parents, the productions of Nature that lay spread all around, were constantly pointed out to me. They soon became my playmates; and before my ideas were sufficiently formed to enable me to estimate the difference between the azure tints of the sky, and the emerald hue of the bright foliage, I felt that an intimacy with them, not consisting of friendship merely, but bordering on phrenzy, must accompany my steps through life;—and now, more than ever, am I persuaded of the power of those early impressions. They laid such

hold upon me, that, when removed from the woods, the prairies, and the brooks, or shut up from the view of the wide Atlantic, I experienced none of those pleasures most congenial to my mind. None but aerial companions suited my fancy. No roof seemed so secure to me as that formed of the dense foilage under which the feathered tribes were seen to resort, or the caves and fissures of the massy rocks to which the dark winged Cormorant and the Curlew retired to rest, or to protect themselves from the fury of the tempest. My father generally accompanied my steps, procured birds and flowers for me with great eagerness,—pointed out the elegant movements of the former, the beauty and softness of their plumage, the manifestations of their pleasure or sense of danger,—and the always perfect forms and splendid attire of the latter. My valued preceptor would then speak of the departure and return of birds with the seasons, and would describe their haunts, and, more wonderful than all, their change of livery; thus exciting me to study them, and to raise my mind towards their great Creator.

"A vivid pleasure shone upon those days of my early youth, attended with a calmness of feeling, that seldom failed to rivet my attention for hours, whilst I gazed in ecstacy upon the pearly and shining eggs, as they lay imbedded in the softest down, or among dried leaves and twigs, or were exposed upon the burning sand or weather-beaten rock of our Atlantic shores. I was taught to look upon them as flowers yet in the bud. I watched their opening, to see how Nature had provided each different species with eyes, either open at birth, or closed for some time after; to trace the slow progress of the young birds toward perfection, or admire the celerity with which some of them, while yet unfledged, removed themselves from danger to security.

"I grew up, and my wishes grew with my form. These wishes were for the entire possession of all that I saw. I was fervently desirous of becoming acquainted with nature. For many years, however, I was sadly disappointed, and for ever, doubtless, must I have desires that cannot be gratified. The moment a bird was dead, however beautiful it had been when in life, the pleasure arising from the possession of it became blunted; and although the greatest care was bestowed on endeavours to preserve the appearance of nature, I looked upon its vesture as more than sullied, as requiring constant attention and repeated mendings, while, after all, it could no longer be said to be fresh from the hands of its Maker. I wished to possess all the productions of nature, but I wished life with them. This was impossible. Then what was to be done? I turned to my father, and made known to him my disappointment and anxiety. He produced a book of *Illustrations*. A new life ran in my veins. I turned over the leaves with avidity; and although what I saw was not what I longed for, it gave me a desire to copy Nature. To Nature I went, and tried to imitate her, as in the days of my childhood I had tried to raise myself from the ground and stand erect, before Time had imparted the vigour necessary for the success of such an undertaking.

"How sorely disappointed did I feel, for many years, when I saw that my productions were worse than those which I ventured (perhaps in silence) to regard as bad, in the book given me by my father! My pencil gave birth to a family of cripples. So maimed were most of them, that they resembled

the mangled corpses on the field of battle, compared with the integrity of living men. These difficulties and disappointments irritated me, but never for a moment destroyed the desire of obtaining perfect representations of nature. The worse my drawings were, the more beautiful did I see the originals. To have been torn from the study would have been as death to me. My time was entirely occupied with it. I produced hundreds of these rude sketches annually; and for a long time, at my request, they made bonfires on the anniversaries of my birth-day."

As the bent of such inclinations could not be mistaken, he was sent to France, when very young, and applied himself with great patience and industry to drawing. But at the age of seventeen, when he returned to his native country, although he was familiar with those rudiments of the higher branches of the art, heads and noses of giants and horses; and although the celebrated David had guided his hand, he cast them all aside at the sight of his native woods, and with great ardour commenced that unrivalled collection of drawings, "The Birds of America," which Cuvier has pronounced "*the most magnificent monument which has hitherto been raised to ornithology.*"

"In Pennsylvania, a beautiful state, almost central on the line of our Atlantic shores, my father, in his desire of proving my friend through life, gave me what Americans call a beautiful 'plantation,' refreshed during the summer heats by the waters of the Schuylkill river, and traversed by a creek called Perkioming. Its fine woodlands, its extensive fields, its hills crowned with evergreens, offered many subjects to my pencil. It was there that I commenced my simple and agreeable studies, with as little concern about the future as if the world had been made for me. My rambles invariably commenced at break of day; and to return wet with dew, and bearing a feathered prize, was, and ever will be, the highest enjoyment for which I have been fitted.

"Yet think not, reader, that the enthusiasm which I felt for my favourite pursuits was a barrier opposed to the admission of gentler sentiments. Nature, which had turned my young mind towards the bird and the flower, soon proved her influence upon my heart."

He married; passed twenty years of his life in vain commercial attempts to become rich, "after the ways of men," and after many unhappy struggles with the opinions of his friends, and irritated at the restraint they sought to impose upon his inclinations, he broke away from them all, and gave himself up to his own favourite pursuits. Unknown, without fortune, and in opposition to the wishes of his friends, he abandoned every thing for nature; led by that irresistible passion, which, at a ripened age, and in possession of those advantages which usually bind men to society,

has again drawn him into the unfrequented wilds of the remote shores of his native America. In April, 1824, he visited Philadelphia, which gave him an opportunity of exhibiting his drawings, and forming a few valuable acquaintances. Dr. Mease presented him to Charles Lucien Bonaparte, one of the most learned ornithologists of the present day, and to whom the world owes the splendid continuation of Wilson's ornithology. By this gentleman he was greatly encouraged to persevere in his pursuits, with a view to future independence and eminence; and after exploring the State of New York, in "the wildest solitudes of the pathless and gloomy forests," he after an absence of eighteen months, returned to his family, then in Louisiana, and "explored every portion of the vast woods around."

But his port folio, at length,—after having been destroyed, as he relates at page 13,—became full; and remembering the encouragement he had received from his friend, Charles L. Bonaparte, his somewhat ambitious mind was turned to Europe, as the only country where his labours would be cherished.

"America being my country, and the principal pleasures of my life having been obtained there, I prepared to leave it, with deep sorrow, after in vain trying to publish my Illustrations in the United States. In Philadelphia, WILSON'S principal engraver, amongst others, gave it as his opinion to my friends, that my drawings could never be engraved. In New York, other difficulties presented themselves, which determined me to carry my collections to Europe.

"As I approached the coast of England, and for the first time beheld her fertile shores, the despondency of my spirits became very great. I knew not an individual in the country; and although I was the bearer of letters from American friends, and statesmen of great eminence, my situation appeared precarious in the extreme. I imagined that every individual whom I was about to meet, might be possessed of talents superior to those of any on our side of the Atlantic! Indeed, as I for the first time walked in the streets of Liverpool, my heart nearly failed me, for not a glance of sympathy did I meet in my wanderings, for two days. To the woods I could not betake myself, for there were none near.

"But how soon did all around me assume a different aspect! How fresh is the recollection of the change! The very first letter which I tendered procured me a world of friends. The RATHBONES, the ROSCOES, the TRAILLS, the CHORLEYS, the MELLIES, and others, took me by the hand; and so kind and beneficent, nay, so generously kind, have they all been towards me, that I can never cancel the obligation. My drawings were publicly exhibited, and publicly praised. Joy swelled my heart. The first difficulty was surmounted. Honours which, on application being made through my friends, Philadelphia had refused, Liverpool freely accorded.

We knew Audubon in London, being on a visit there, as well as himself, and know how much his feelings were wounded, by the refusal alluded to, of the social honours of Philadelphia. This slight is by no means to be imputed to his countrymen at large, to whom he was comparatively unknown. The transaction grew out of the spirit of jealousy, which is always illiberal, and the frequent parent of misrepresentation and calumny. Some of the friends of Wilson did not view, with the most cordial spirit, those evidences of transcendent merit, which others willingly accorded to Audubon's drawings; then arose the spirit of party, and with it malevolence. A few small minds, who knew little or nothing of nature, and who had officiously intruded themselves into this matter, endeavoured to make up for their want of knowledge on the subject, by excess of bad zeal. Opinions were industriously circulated, that Audubon had, in many instances, attempted to impose upon the credulity of the world, by inventing stories which had no foundation in truth, because they were contrary to the known habits of the animals they concerned; as if the habits of the animals of this vast continent, could possibly be known to any other class of men, but that adventurous one, which, like Audubon, had passed their whole lives in observing them; and because he had executed a drawing of inimitable force and beauty, of "*mocking birds defending their nest from a rattlesnake,*"—a picture which cannot be contemplated without the liveliest emotions, and of which one of the best judges in Europe, Mr. Swainson, in an elegant encomium, has said, "every part of the story is told with exquisite feeling;" they selected this to exercise their detraction upon; and concluding, because the books of systematic naturalists, had not mentioned this habit of the rattlesnake of climbing up bushes, that it was a fair presumption the animal did not and could not climb; they industriously circulated a report, that he had imposed a deliberate lie upon the world, and that no doubt he had done so in many other instances. Thus overwhelmed with calumny, and absent, his friends,—and he had a few, both true and steady,—had the mortification to witness the temporary success of this bad combination, and see the name of this great naturalist, that would do honour to any society, rejected, and in a scornful manner. It is painful to allude to this circumstance, which is somewhat notorious; but that the shame, which belongs to a very few, may

not be imputed to all, we have here given a true history of a conspiracy, got up to utterly break down and ruin the reputation of one of the most remarkable men America ever produced: a man, whom the Royal Society of London, nearly all the distinguished societies of Great Britain, and many others in France, have subsequently lavished their highest honours upon. We have the satisfaction to add, that previous to his return to his native country, in September last, atonement was made to him for this persecution. The American Philosophical Society, at a full meeting of its most respectable members, disregarding the calumnies yet assiduously circulated by a few, elected him an associate, and subscribed for a copy of his magnificent work; and the society from whence he had formerly been rejected, paid him the same tribute of respect.

This Journal has always been prompt to repel unfriendly imputations directed against Audubon; his claims to public confidence were vindicated in our September number.* There is a communication from Col. Abert, of the U. S. Topographical engineers, where the most conclusive evidence is given from officers of high rank in the U. S. service, that the rattlesnake has those habits of climbing, and has been seen by others, in the situation depicted by Audubon.† These gentlemen have been able to offer their testimony of his fidelity to nature, because they too have had rare opportunities of observing the habits of animals, in the distant and unfrequented territories of our country.

The remainder of the introductory address, from which we have made our quotations, is devoted to an account of the cordial manner with which he was received in Liverpool and Edinburgh, of the grateful attentions paid to him by some of their most distinguished inhabitants, of which a list is given. No sooner was his great merit perceived, than he was spontaneously and gratuitously enrolled a member of their first societies. Audubon was now about to enter upon the fruition of those anticipations which so long had borne him up; and encouraged from every quarter, he opened an exhibition of his drawings. We extract the following from Blackwood,‡ a periodical which has been eloquent in the commendation of Audubon.

"Soon after his arrival in Edinburgh, where he soon found many friends,

*See Month. Am. Jour. of Geology, Sept. 1831, p. 138. † Do. Nov. 1831, p. 221.
‡See Blackwood's Edinburgh Mag. July 1831, p. 14.

he opened his exhibition. Four hundred drawings,—paintings in water colours—of about two thousand birds, covered the walls of the institution hall, in the royal society buildings, and the effect was like magic. The spectator imagined himself in the forest. All were of the size of life, from the wren and the humming bird, to the wild turkey and the bird of Washington. But what signified the mere size? The colours were all of life too—bright as when borne in beaming beauty through the woods. There, too, were their attitudes and postures, infinite as they are assumed by the restless creatures, in motion or rest, in their glee and their gambols, their loves and their wars, singing, or caressing, or brooding, or preying, or tearing one another into pieces. The trees too, on which they sat or sported, all true to nature, in hole, branch, spray, and leaf; the flowering shrubs, and the ground flowers, the weeds, and the very grass, all American—so too the atmosphere and the skies—all transatlantic. 'Twas a wild and poetical vision of the heart of the new world, inhabited as yet almost wholly by the lovely or noble creatures, 'that own not man's dominion.'"

We know not in what more expressive language, we could have sought to do justice to the magic drawings of Audubon, than that of the quotation we have just made.

The complete success of this exhibition, decided Audubon upon the great undertaking he has, in part, most admirably accomplished; that of engraving these magnificent drawings. We should not do justice to them, if we were to omit the following passage in the introductory address:—

"Merely to say, that each object of my illustrations is of the size of nature, were too vague—for to many it might only convey the idea that they are so, more or less, according as the eye of the delineator may have been more or less correct in measurement simply obtained through that medium; and of avoiding error in this respect I am particularly desirous. Not only is every object, as a whole, of the natural size, but also every portion of each object. The compass aided me in its delineation, regulated and corrected each part, even to the very fore-shortening which now and then may be seen in the figures. The bill, the feet, the legs, the claws, the very feathers as they project one beyond another, have been accurately measured. The birds, almost all of them, were killed by myself, after I had examined their motions and habits, as much as the case admitted, and were regularly drawn on or near the spot where I procured them. The positions may, perhaps, in some instances, appear *outre;* but such supposed exaggerations can afford subject of criticism only to persons unacquainted with the feathered tribes; for, believe me, nothing can be more transient or varied than the attitudes or positions of birds. The Heron, when warming itself in the sun, will sometimes drop its wings several inches, as if they were dislocated; the Swan may often be seen floating with one foot extended from the body; and some Pigeons, you well know, turn quite over, when playing in the air. The flowers, plants, or portions of trees which are attached to the principal objects, have

been chosen from amongst those in the vicinity of which the birds were found, and are not, as some persons have thought, the trees or plants upon which they always feed or perch."

Taking it for granted, that the patronage which this great work has begun to receive in this country, will soon be so much extended, as to enrich every considerable town in the United States with at least one copy,—for what town or neighbourhood is there, which does not possess patriotic, wealthy, and liberal friends to the arts, who can unite in a subscription for this purpose?—we shall not repeat the encomiums it so well deserves: we imagine there are few of our readers, who will not be able to have access to this unrivalled work; to those, however, who hitherto have not had an opportunity of seeing it, we shall state,—what they may already have conceived, knowing the objects described to be as large as life,—that the first volume, already published, containing one hundred plates, is truly a gigantic volume. We saw a copy of it, recently, bound in calf, brought by Mr. Audubon from England, which weighed forty-five pounds. The pages are three feet three inches long, and two feet two inches broad. Each number, the price of which is two guineas, or about ten dollars, contains five plates: one hundred and twenty-four plates have already been published, of which one hundred form the first volume: the others will appear gradually; so that the total amount of the cost of this unrivalled work, is progressively paid, and in small sums. The intention is, to publish at least five numbers annually. To each volume of plates, consisting of twenty numbers, is annexed a descriptive and narrative volume of "Ornithological Biography."*

This book, which was first published in London, has been reprinted in Philadelphia, and is perhaps the handsomest octavo ever got up in America. But this is its slightest merit; it is in the contents we find what is truly inimitable. Every thing there is communicated in an earnest and simple manner, sometimes with a vivid eloquence and beauty that is touching. There is not one of the one hundred descriptions contained in this volume, where evidences of this may not be found. We open the book at random at page 96, at the head, "Bewick's Wren."

"The bird represented under the name of Bewick's Wren, I shot on the 19th October, 1821, about five miles from St. Francisville, in the state of

† *Ornithological Biography*, Royal 8vo. p. 506. Philadelphia, Judah Dobson.

Louisiana. It was standing, as nearly as can be represented, in the position in which you now see it, and upon the prostrate trunk of a tree, not far from a fence. My drawing of it was made on the spot," &c.

And again, at page 91, "The Carolina Turtle Dove."

"I have tried, kind reader, to give you a faithful representation of two as gentle pairs of Turtles as ever cooed their loves in the green woods. I have placed them on a branch of Stuartia, which you see ornamented with a profusion of white blossoms, emblematic of purity and chastity.

"Look at the female, as she assiduously sits on her eggs, embosomed among the thick foliage, receiving food from the bill of her mate, and listening with delight to his assurances of devoted affection. Nothing is wanting to render the moment as happy as could be desired by any couple on a similar occasion.

"On the branch above, a love scene is just commencing. The female, still coy and undetermined, seems doubtful of the truth of her lover, and virgin-like resolves to put his sincerity to the test, by delaying the gratification of his wishes. She has reached the extremity of the branch, her wings and tail are already opening, and she will fly off to some more sequestered spot, where, if her lover should follow her with the same assiduous devotion, they will doubtless become as blessed as the pair beneath them.

"The Dove announces the approach of spring. Nay, she does more:—she forces us to forget the chilling blasts of winter, by the soft and melancholy sound of her cooing. Her heart is already so warmed and so swelled by the ardour of her passion, that it feels as ready to expand as the buds on the trees are, under the genial influence of returning heat."

But to do perfect justice to his genius, we must, at the same time, see the beautiful drawing where these turtle doves are represented; then, indeed, we perceive that nature has not spoken to him in vain, and that he can express the feelings she has inspired him with, with great force.

Even the dear little house-wren, he has given us a most pleasing and minute account of. What can be more amusing, cheerful, and ridiculous, at the same time, than the family picture of plate 83, where the nest is in an old hat, stuck on a twig, the male beginning his song on the edge of the hat, and the anxious mother arriving with a fine fat spider, which one of the pets is squeezing himself through a hole to get at: and then this family history is followed up, so as to give us a direct interest in all the wren family, wherever we may meet them.

"When the young issue from the nest, it is interesting to see them follow the parents amongst the currant bushes in the gardens, like so many mice, hopping from twig to twig, throwing their tails upwards, and putting their

bodies into a hundred different positions, all studied from the parents, whilst the latter are heard scolding, even without cause, but as if to prevent the approach of enemies, so anxious are they for the safety of their progeny." See page 428.

In some remarks on Audubon's works, contained in the Edinburgh New Philosophical Journal, for April 1831, it is said:

"It is not enough to say, that our author has invented a new style in the representation of natural objects; for so true are his pictures, that he who has once seen and examined them, can never again look with pleasure on the finest productions of other artists. To paint like Audubon, will henceforth mean, to represent Nature as she is. The birds are represented such as Nature created them, of their full dimensions, glowing in all the beauty of their unsullied plumage, and presenting the forms, attitudes, and motions peculiar to the species. In no case do they appear before us in the stiff and formal attitudes in which we find them in other works, perched upon an unmeaning stump or stone. On the contrary, they are seen in all imaginable positions, pursuing their usual avocations. The fore-shortenings and varieties of attitude which induce painters generally to present side views only, *seem to have been accounted as nothing out of the ordinary course of drawing*; with so much delicacy, grace, and vigour, have the most difficult positions been managed. A peculiar charm is given to these representations, by the circumstances that the trees, plants, and flowers of the districts in which they occur, are all represented, generally with surprising accuracy, and always with great taste. The flowing festoons of climbing shrubs and creepers, hung with broad leaves, garlands of flowers, and clustered berries, the lichen-crusted branches of the forest trees, and the decayed stumps on which the woodpeckers seek their food, are in themselves objects of admiration."

This is just praise, and many are the British periodicals in which we find language of this kind. The same may be said with great truth, of his biographical descriptions: in them he does not appear as the dry, systematic naturalist, the manufacturer of the barbarous Latin jargon, after the manner of the old school, but as the delightful historian of those birds, of which he is the unrivalled painter. In his descriptions, we find the persuasive power of a mind, which has not been moulded in the conventional forms of society, but taught by its own unrestrained experience, acquired in nature's most retired solitudes, where she was sought, and wooed, and won. For proofs of this, we refer our readers to page 372, where the wood-thrush is described with a train of eloquent thought, that does him honour as a man and a writer. But we think that it is in his account of the mocking-bird, at page 108, that the power and happy gracefulness of his language are most conspicuous.

"It is where the great magnolia shoots up its majestic trunk, crowned with evergreen leaves, and decorated with a thousand beautiful flowers, that perfume the air around; where the forests and fields are adorned with blossoms of every hue; where the golden orange ornaments the gardens and groves; where bignonias of various kinds interlace their climbing stems around the white-flowered Stuartia, and mounting still higher, cover the summits of the lofty trees around, accompanied with innumerable vines, that here and there festoon the dense foliage of the magnificent woods, lending to the vernal breeze a slight portion of the perfume of their clustered flowers; where a genial warmth seldom forsakes the atmosphere; where berries and fruits of all descriptions are met with at every step."

This is the eloquent introduction to one of the most fascinating descriptions of the bird himself, his courtship, his song, and the thousand cares between the construction of the nest, and the fledging of their young.

We trust we have said enough to inspire those of our readers who have not read this charming book, with a desire to acquire it: and to it we refer them for the noble descriptions of the larger birds. The bird of Washington, the stately hawk, the black warrior, (falco Harlani,) called after his tried friend, Dr. Harlan, the wild turkey, and its other various contents. But besides these attractions, it contains the most interesting narratives of his adventures, and local descriptions, judiciously interspersed through the work, to the number of twenty. They are as follows: *the Ohio, the great pine swamp, the prairie, the regulators, improvements in the navigation of the Mississippi, a flood, Meadville, the cougar, the earthquake, the hurricane, Kentucky sports, the traveller and the pole-cat, deer hunting, Niagara, hospitality in the woods, the original painter, Louisville in Kentucky, the eccentric naturalist, Scipio and the bear, and Col. Boon.* These narratives are many of them so powerful, that we rise from the repeated reading of them, almost as familiar with the subject, as if we had been the companions of Mr. Audubon in his romantic adventures.

Audubon is now in Florida, leading the woodman's life he is so partial to; from thence he will either ascend the Mississippi, or strike into the unfrequented wilds of Texas. It is his intention to penetrate, if possible, into California, to whose natural history we are almost entire strangers. He is furnished with all the protection the American and British governments could afford him, having the most powerful recommendations to all the posts on the distant frontiers. We shall continue, whenever

we are able to do so, to give information of his progress and adventures. May our opportunities be frequent and fortunate, until we can greet him again on our Atlantic shore. We most sincerely hope, that the life of this adventurous and accomplished naturalist will be spared. He has already done enough to secure a lasting renown; but such is his unextinguishable spirit, that when his great work, the "Birds of America," is all engraved, it is only to be the precursor of a still greater; a gallery executed in oil, as large as life, of all the subjects of his masterly drawings. This gallery is already in progress. What a splendid acquisition for the congress of the United States of America!

Ere we leave, for a while, this attractive subject, we desire to say one word more on the encouragement this magnificent work has received in the native country of its gifted author. On the arrival of Audubon in the United States, in September last, we believe he had only six subscribers, including the national library at Washington. Since that period, the number, we understand, has increased to twenty-four. Of these, we believe, five are received in literary and scientific societies. Two copies have been ordered by the legislature of the State of Louisiana, and one by the legislature of S. Carolina. Philadelphia possesses four copies, Baltimore three, Boston, we believe, one. *New York*, we think, at least we have heard so, one. There is one subscriber in Kentucky; Charleston in S. Carolina, possesses three copies. Where Audubon is known, he is sure to make friends, and we have conceived a high idea of the intelligence and liberality to be found in the State of Georgia, from the fact, that in a town with so limited a population as Savannah, he has no less than seven subscribers. All these, which do not constitute one fifth of the patronage Audubon deserves from the United States, will greatly increase the opportunities which individuals will have, of seeing this magnificent work. There is but one obstacle to its perfect success, and that consists in the duties the work is subjected to, on arriving in this country. Those who have the spirit to appreciate and acquire it, deserve every praise, knowing as they do, *that foreigners have the privilege of possessing the works of their gifted countryman, at a much less expense than they do themselves.* We intend no allusion to either tariff or anti-tariff opinions; under any laws, exceptions should be made in favour of works of ac-

knowledged genius of the first order; and we think this duty will be a reflection upon every succeeding congress, as it is upon the present one, until the "Birds of America" are permitted to come in without duty, and free as the animated beings of which they are the beauteous resemblances. We think, also, that every department of the government ought to subscribe for a copy of this truly national work; and we hope, ere long, to learn that every legislature in the union will follow the examples set by Louisiana and S. Carolina.

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

In our December number, for 1831, we gave an account of the meeting at Hamburgh, in Germany, of the *Cultivators of Natural Science and Medicine*, and expressed our intention to lay before our readers an account of a proposed scientific meeting of a similar character, to be held at York, in England, in September 1831.

This we should have done before the present time, but for the temporary suspension of our journal, and the confusion attendant upon so unexpected a circumstance.

We are indebted to one of our best friends, who was a conspicuous member of that *great scientific meeting*, as it has been properly called, for a very interesting account of it, together with numerous papers relating to its proceedings. Added to these, we have Mr. Johnston's excellent paper in the January number of Brewster, and the notice of its proceedings in the Philosophical Magazine. From all these sources we propose to condense an account, that we are sure will be acceptable to our readers.

This first attempt to establish what is, in fact, a scientific parliament, with locomotive powers, free to range where it may please, and authorized to convene annually in one of the cities of Great Britain, has eminently succeeded, although some pains had been taken to create doubts as to its usefulness. Many things, however, conspired in its favour. It had originally been proposed by Dr. Brewster, and many of the best names in England had cordially assented to the project. The place of meeting too, was well calculated to induce the members of the as-

sociation to pursue their object *con amore.* The ancient city of York was a Roman station of importance; many interesting remains of the Roman period in England are extant there at this day. Upon the skirts of the city, and near to the mouldering remains of the ancient Roman walls, are the truly venerable ruins of a Christian temple, which, perhaps, yield the palm in extent more than in beauty, to that fine character, which Time, who puts the true finish to cathedral architecture, exhibits more beautifully and profusely in England than in any other country. On this interesting spot of ground, which slopes down to the river Ouse, and which is pregnant with such fine remembrances, the Yorkshire Philosophical Society have constructed an admirable and most convenient building, of classic and elegant proportions, and have placed it between the Roman and cathedral ruins of which we have spoken.

That the most intellectual men in Great Britain could meet at such a place, and upon such an occasion, without being influenced by these associations, could not be; and a week was passed there, consecrated to the interests of science, in the most harmonious and profitable manner. A few of the most distinguished scientific men were not able to attend. The presence of Buckland, Herschell, Sedgewick, Babbage, Airy, and a few other celebrated persons, would have completed an assemblage strong in the names of Dalton, Brewster, Murchison, Witham, Scoresby, Smith, Daubeny, Vernon Harcourt, Greenough, and a host of intellectual men, of established reputation. It added greatly to the interest of the meeting, that several men of rank assisted at the deliberations, and evinced a strong desire to forward the great object of the association. The Archbishop of York paid a marked attention to the members, attended the meetings, and enrolled his name on the list. Lords Milton, Morpeth, Dundas, Sir George Cayley, Sir Thomas Brisbane, Sir Philip Egerton, Sir C. Ibbetson, Mr. Justice Parke, Mr. Archdeacon Wrangham, all eminent patrons of science, became members of the association.

The first assemblage was on the evening of the 26th September, 1831. The ladies and gentlemen of the city and neighbourhood attended in great numbers, for the purpose of giving a cordial welcome to the scientific strangers. During that evening Mr. Phillips, the able secretary of the Yorkshire society,

and nephew to Mr. Smith, the father of English geology, delivered a lecture on some of the geological phenomena of Yorkshire. The next day the first regular meeting was held, to form the association; about three hundred and fifty persons enrolled their names. Lord Milton, who is the eldest son to Earl Fitzwilliam, was placed in the chair. The Rev. Vernon Harcourt, Vice President of the Yorkshire society, delivered an able address, which was ordered to be printed. At 5 P. M. they dined together, and in the evening re-assembled, when Mr. Abrahams, of Sheffield, delivered a lecture on magnetism, illustrated by curious experiments. On the 28th, a paper by Dr. Brewster was read, on the progress of mineralogy and on the crystallographic system of Mohs. On account of the great number of mineral structures discovered by the agency of polarized light, he proposes a "*composite system*," where the crystalline forms which cannot be taken into any of the received systems, may be classed. To this succeeded the reading of a valuable paper on the philosophical character of Priestley, by Dr. Henry of Manchester. In the evening Mr. Potter, of Manchester, exhibited his improvement on the reflecting microscope of Newton. Dr. Brewster also communicated an account of the theory and construction of a lithoscope, to characterize precious stones, by the colours reflected from their surfaces.

On the 29th, the organization of the association was completed. Lord Milton was chosen the first president by acclamation. Oxford was fixed upon as the place of the next meeting, and Dr. Buckland was unanimously chosen President elect. Dr. Brewster, of the University of Cambridge, and Professor Whewell, were also unanimously chosen Vice Presidents elect; and Dr. Daubeny of Oxford, Secretary. Mr. Dalton read a paper "*on the quantity of food, and insensible perspiration.*" He afterwards stated, that it contained a series of experiments made upon himself forty years ago, relating to the weight of food taken, and the secretions, insensible perspiration, and other animal products. He pointed out the utility of such inquiries to physicians. This important paper is to be published in the transactions of the Manchester Literary and Philosophical Society. Mr. Potter then read a paper, the object of which was to point out objections to Fresnel's Theory of Light, deduced from certain experiments on light reflected from metallic surfaces both simple and

compound. Sir George Cayley remarked that the difficulties on this subject were connected with the speculations on the identity between heat and light.

An interesting discussion now arose on the reading of a paper by Mr. William Hutton of Newcastle, on the great "*Whin Sill*," or trap dyke of the northern counties of England. This related to the geological age of the intrusive rocks connected with the whin, (a provincial name for trap.) Mr. Hutton had explored and examined this dyke through a line of one hundred miles between the confines of Northumberland and Yorkshire: he exhibited a section where beds of limestone and shale were superincumbent to it, inferring thence, that these last were posterior to the trap, which he considered to be the overflowing of ancient volcanic action. Mr. Murchison, the President of the Geological Society of London, entertained a different opinion as to the relative age of these rocks. He had personally examined the district. He considered Mr. Hutton's paper to be a very able one; it was true that the basaltic matter was found in beds between the strata alluded to; but he had reason to believe there was a connection between the whin dykes of Durham, and those stratified beds, which he considered to be intrusive, and that they had been injected laterally not only into the carboniferous limestone, but into later rocks. He thought it important that further examinations should be made in relation to the general connection of all this basaltic matter. He was entirely of opinion that all this matter had been laterally injected since the deposit of the rocks which enclosed it. [*This is also the opinion of Professor Sedgewick, who has made a profound study of these phenomena. We propose in the plate to our next number to give a figure from Mr. M'Culloch's Western Islands, of the manner in which the trap is found in Trotternish, laterally injected, between the strata of sandstone.*]

Mr. Johnston now read a paper upon the metal provisionally called vanadium, and exhibited some beautiful crystals formed by gradual cooling. We trust that this gentleman will be induced, by our present number, to do perfect justice to this subject.

Mr. Witham, of Lartington, next gave a very interesting sketch of the fossil flora. Nothing could happen more fortunately for the cause of fossil botany,—which is so much in-

debted to M. Adolphe Brogniart,—than the application of Mr. Witham's ingenious method of detecting the structure of fossil vegetables; we think it will, ere long, be generally applied to all doubtful fossil substances.

Mr. Phillips concluded the morning with a paper from Dr. Henry, on the roasting of the copper ore of Anglesea. The ore, when roasted, gives lumps, which contain from thirty to fifty per cent. of copper; these are picked out and then smelted. The Archbishop of York was present during a part of these proceedings. In the evening the Rev. Mr. Scoresby delivered to a very numerous assemblage of ladies and gentlemen, the result of his experiments on the law of magnetic induction: the magnetic force diminishes with the square of the distance; and he has invented a method of applying the magnetic influence to the admeasurement of rocks and solid substances in situations where these are not, by known methods, measureable. The application of this curious branch will probably become of great value in mining operations. Many rocks occasion a sensible deviation of the needle, and it is probable that when we are better acquainted with the magnetic intensity of the various rocks, we shall be able to measure their thickness. Mr. Scoresby has found that he can, by his own magnets, cause an angular deviation of the needle, from a distance of sixty feet, through the most solid substances.

On the morning of Friday the 30th, Dr. Brewster communicated an interesting paper *on the structure of the crystalline lens in the eyes of fishes.* The various arrangements of this structure, adapted to the wants of these animals, through their extensive distribution in the waters of the globe, are extremely instructive and curious. To this communication succeeded a very lively geological discussion, in relation to certain marine shells, of existing shells of mollusca, found in gravel pits about Preston in Lancashire, and which, it appears, are elevated three hundred feet above the level of the sea. There is a communication on this subject at p. 170, Vol. III. of the Magazine of Natural History, from the Rev. Mr. Gilbertson, who had collected these shells as early as 1829. Mr. R. C. Taylor also has two notes following the same communication. The country appears to be covered with a marl, and, according to the observation of Mr. Murchison, the sands, marls, and gravels, have no deposit super-

incumbent to them, save some blocks of Cumbrian origin, and which alone may be referred to what is called a diluvian origin. These shells are the *Buccinum undatum*, *Purpura lapillus*, *Triton macula*, *Murex erinaceus*, *Fusus bamffius*, and *Turritella terebra*, of Fleming. *Turbo littorius*, and *terebra*, *Cardium echinatum*, *Mactra solida*, *Dentalium striatum*, &c. &c. and Mr. R. C. Taylor has remarked, that their appearance is fresher, and more like recent marine shells found on the beach, than even those of the *Suffolk Crag*, which has hitherto been considered the most recent deposit. Many of them were embedded in, and filled with marl, as if it had always been their natural bed.

Mr. Murchison having made York one of the points of a very extensive geological excursion, had just examined the north-western coast of Lancashire. His account of this interesting district was listened to with great interest. The inference he drew, was, that the beds, containing these *quasi* recent shells, do not belong to the class called by some geologists *diluvial*, although the deposits have an analogous appearance, but that they have been raised from the bottom of the sea, to their present elevation, almost within historical times; at any rate, subsequent to the appearance of the same marine mollusca, which now inhabit the Irish channel. This is a branch of geology in which Mr. Murchison is pre-eminently skilled, and his opinions on the subject are entitled to great consideration. These conclusions will probably be found applicable to other parts of the coast, and perhaps to many parts of Yorkshire. We are of opinion that Mr. Phillips, when he publishes another edition of his excellent work, will find it expedient to modify his *diluvial* opinions. Facts of a like nature have been observed in Sicily by Mr. Lyell, and recently by Dr. Turnbull Christie. This gentleman has observed upon the flanks of Mount Grifone,—an elevated mountain of dolomitic limestone,—the following subdivision of the deposit, which once would have been called *diluvial*. We use the descending order.

Blocks of limestone.

Bone breccia, with cave bones.

Pebbles and sands, with existing shells.

Upper sub-appenine, with many existing shells.

The inference set up is, that the bone breccia has been washed down anciently into the sea, and that all the beds have subse-

quently been raised. To these facts we would add, that in many parts of this country, the same circumstances, no doubt, occur along the Atlantic border. In Alabama, gravel beds of a similar character, are found near fort Clairborne, now about seventy miles from the sea, and elevated, we suppose, about sixty feet from its level. We shall hereafter return to this branch of American geology.

Dr. Daubeny next brought up the interesting subject of hot springs, their connexion with volcanic action, the occurrence of azote in them, and the method of detecting it. Some of Dr. Daubeny's opinions were controverted: it was urged, that however satisfactorily particular phenomena might seem to be constructed from one cause, yet that different causes produce in our laboratories the same phenomena, which might be the case in the great laboratory of nature. This subject engaged both geologists and chemists in an animated conversation.—The members of the association were entertained this day, by his Grace the Archbishop, in the most cordial and hospitable manner, at the ancient archiepiscopal palace of Bishopthorpe. In the evening, the party returned to the Institution, where Mr. Potter communicated an account of the analogy of electricity in the Torricellian vacuum, to the aurora borealis. Dr. Warwick exhibited the method of Professor Moll, for making a temporary magnet of soft iron, by magnetic action. Dr. Daubeny exhibited a sphere of wire gauze, which, when dipped in water, filled; and on being lifted out, retained the fluid. When shaken, the water flowed from the pores. The phenomenon was explained by the principle of capillary attraction.

On Saturday, a valuable memoir was read by Mr. Dalton, on "*The Specific gravity of the Human Body.*" This is to appear in the Manchester Transactions. Mr. Dalton supposes the pores of the body to be filled with air, which, together with the air in the lungs, sustains us against the pressure of the atmosphere, leaving the solid parts free to use their functions. Mr. Scoresby related some facts connected with oceanic pressure on wounded whales: they sometimes descend a mile, but return exhausted, and blowing out blood, the pressure forcing a portion of it out of the vessels into the lungs. Mr. Allan, of Edinburgh, described a large aquamarine, brought from Brazil by Don Pedro. Mr. Robison explained, aided by his drawings, a contrivance for ex-

pelling elastic fluids from his fine linseed oil barometer. Dr. Brewster exhibited alum and rock salt prisms, excelling the finest glass prisms. This adaptation of cheap substances to such a purpose, produced some explanation as to Dr. Brewster's views of the heating rays of Herschell, supposed to be most numerous in the dark part of the spectrum, where he found the temperature highest. Dr. Brewster is of opinion, that there are no rays of heat unaccompanied by light.—Colouring matters also were treated upon. It was argued, that where a mixture of bodies has changed the colour of both or either, it is not that the one has penetrated into the other, so as to impart its colour to it, but that the union of the two has taken place in such a manner, as to produce an arrangement of the particles, which causes the light to be reflected in a particular way.—Mr. Forbes then read an elaborate paper, on the horary oscillations of the barometer. The morning closed by a communication from Sir James South to Dr. Brewster; he had lately observed one of the satellites of Jupiter, which were generally supposed to disappear, when within the disc of the planet, to appear as a black spot on its surface. He was desirous of having this anomaly accounted for.

In the evening, Dr. Daubeny explained some experiments of the Rev. Mr. Taylor, of York, with a view to increase the intensity of gas light, without increasing the consumption of gas. The Rev. Mr. V. Harcourt also explained the principle of a new lamp, invented by him, for the purpose of economising light, by the use of cheaper oils. An able memoir by Brewster, was then read, "*On a New Analysis of Solar Light.*" The last paper read, was a translation of a memoir, by Professor Gazzeri, of Florence, "On a method of rendering visible the traces of erased writing." This consisted mainly in the application of heat. Dr. Brewster mentioned, that the legends of worn out coins and medals, when placed on hot iron, would evolve in like manner. He had been much surprised, at first reading on such a medal, in letters in flame, the legend, "*Benedictum sit nomen Dei.*"

Lord Morpeth now addressed the meeting, and moved thanks to Dr. Brewster; when the unbounded applause had subsided which his eloquent speech produced,

Mr. Murchison, on the part of Dr. Brewster and his other scientific friends, begged leave to return thanks for the high honour done to the contributors of scientific memoirs, and for the kind assistance and valuable aid which had

been received from the residents of York and the neighbourhood, in the promotion of the objects of this meeting. He explained the motives which first induced the original promoters of the meeting to select the city of York for their first assembly. To this city, as the cradle of the association, they should ever look back with gratitude; and whether they met hereafter on the banks of the Isis, the Cam, or the Forth; to this spot, and to this beautiful building, they would still fondly revert, and hail with delight the period at which, in their gyration, they should return to this the point of their first attraction. Mr. Murchison concluded by warmly eulogizing the kind reception and hospitality which the strangers had experienced from the Archbishop, and from all classes of the inhabitants of the city and neighbourhood. He concluded, amidst loud applause, with a motion of thanks, as follows:—"That the cultivators of science here assembled, do return their most grateful thanks to His Grace the Archbishop of York, the Patron, and to the officers and members of the Yorkshire Philosophical Society, for the very liberal manner in which, by the use of their Halls and Museum, and by their obliging and unwearied efforts to provide every accommodation and comfort to the visitors, they have so essentially contributed to the success and prosperity of this association."

The motion was seconded by Dr. Brewster. Mr. Dalton also rose to express his entire concurrence in Mr. Murchison's observations.

The Rev. W. V. Harcourt said, it was quite unnecessary, from the feelings which he knew to pervade the breasts of all, both scientific strangers and residents, to put to the vote of the meeting either of the proposals so eloquently brought forward. In the long period of its existence, the ancient city of York had never greater reason to be proud than of the genius and talent it contained within its walls at this moment, and of the honour it had obtained of being the birth-place of an Association destined (he firmly believed) greatly to enlarge the boundaries of science. After speaking with much depth of feeling of the grateful recollections which this meeting would furnish, of the valued friendships which it had been the occasion of forming, and of the pleasing anticipation of future meetings, when the infant association should be more matured and adequate to its lofty aims, Mr. Harcourt concluded by declaring the meeting adjourned to Oxford.

Tea and coffee were then served to the visitors, and the company separated, highly delighted with the intellectual and social treat which they had enjoyed throughout the week.—*York Courant.*

The nature of this association will be more fully understood by reference to Dr. Brewster's Number for Jan. 1832, to which we refer our readers; we shall, however, publish the preface to the first report of the association, which has subsequently appeared. We take it from the Philosophical Magazine, for March, 1832, page 225.

In giving to the public a Report of the Proceedings of the British Association for the Advancement of Science, it has been considered an important

object to add to the account of the past meeting a distinct view of what is to be expected from the next, and to announce the result of the applications which have been made to individuals, requesting them, in the name of the Association, to undertake the reports and researches recommended by its committees in different branches of science.

The success of these applications will appear from the following statement.

Reports.—1. The Rev. George Peacock has undertaken to present to the next meeting, a report on the recent progress of Mathematical Analysis, in reference particularly to the differential and integral calculus.

2. Professor Airy has undertaken a report on the state and progress of Astronomical Science, in reference particularly to Physical Astronomy.

3. J. W. Lubbock, Esq. has consented to furnish such information respecting the data and desiderata for calculating the time and height of high-water as he may be able to offer.

4. James D. Forbes, Esq. has undertaken to present a report on the present state of Meteorological Science.

5. Dr. Brewster has undertaken a report on the progress of Optical Science.

6. The Rev. Robert Willis has undertaken a report on the state of our knowledge concerning the Phenomena of Sound, in reference especially to the additions recently made to it.

7. The Rev. Professor Powell has undertaken a similar report respecting the Phenomena of Heat.

8. The Rev. Professor Cumming has undertaken a report on the recent progress of Chemical Science, especially in foreign countries.

10. The Rev. Professor Whewell has undertaken a report on the state and progress of Mineralogical Science.

11. Robert Stevenson, Esq. has undertaken the report recommended by the Geological and Geographical Committee, on the waste and extension of the land on the east coast of Britain, and on the question of the permanence of the relative level of the sea and land.

12. Professor Lindley has undertaken to give an account of the principal questions recently settled, or still agitated, in the Philosophy of Botany.

Researches.—There is reason to hope that the earnest wish expressed by the Mathematical and Physical Committee, that a register of the thermometer, during every hour of the day and night, should be kept at some station in the south of England, will be realized at Plymouth under the superintendence of Mr. Harvey, with the enlightened concurrence of those who have the power of enabling him to render this public service to science.

The law of the decrease of temperature with increasing elevations in the atmosphere, will be illustrated by a continuation of experiments with balloons by the Earl of Minto.

The secretaries of the Yorkshire Philosophical Society have commenced the observations recommended, on the comparative quantities of rain falling on the top of York Minster and near its base; and the society has formed a Meteorological Committee, by whose labours other researches, which have

been recommended in that branch of science, may be expected to be advanced.

The observations on the intensity of Terrestrial Magnetism, proposed by the Mathematical and Physical committee, have been undertaken by Dr. Traill; and the Royal Society of Edinburgh have lent for his use their Standard Needle, constructed under the superintendence of Professor Hansteen.

A summary of the observations which Mr. Henwood is making on the electro-magnetic condition of metalliferous veins will be presented to the meeting; and it is probable that the suggestion of the committee may be followed, in regard to the extension of these experiments to veins which traverse horizontal and dissimilar strata.

There is reason to expect that the objects contemplated by the Chemical Committee, in recommending a revision of some of the primary data of chemistry, will derive light from the labours of Dr. Prout and Professor Turner, in addition to those of the eminent philosopher from whom the recommendations originated.

Professor Daubeny and Mr. Johnston have undertaken the analytical researches respectively entrusted to them; and specimens of iron in different stages of its manufacture have been transmitted to the latter gentleman from the principal iron works in Yorkshire.

In Geology, the inquiry respecting parallelism in the lines of disturbance of the British strata will receive, it is hoped, the joint consideration of the Rev. Wm. Conybeare and the Rev. Professor Sedgwick.

In Botany, the comprehensive inquiry proposed by the committee will be illustrated by contributions which Professor Henslow proposes to add to the Flora Cantabrigiensis, and by a systematic catalogue of the native plants of the county of York, which the sub-curator of the Yorkshire Philosophical Society is preparing for the press.

Lastly, in Zoological research, for which no provision was made at the late meeting, the officers of the Association have received from Dr. Knox the promise of a memoir on the natural history of the Salmon.

We cannot conclude this paper, without expressing our unqualified admiration, not only of the motives which have induced so many eminent men to establish this truly scientific association, but of the manner in which they have proceeded to execute their intentions. There was, at first, some jealousy and some opposition, but we hear little of either at present. As far as we are informed, nearly all the leading men of science, at the universities of Oxford and Cambridge, have enrolled their names in the list of members. We suppose that by this time, the most distinguished men in the metropolis, will have followed their example. We understand that several who did not assist at the York meeting, including that eminent chemist, Prout, have

already sent in their adhesion. In June next, the association convenes at Oxford. There never was such an assemblage of men convened in so magnificent a city before. We shall endeavour to give our readers a faithful account of what it is our misfortune, not to be able to be a personal spectator of.

Thus will this great association be annually employed, visiting the principal cities of Great Britain, in, to use the eloquent language of Mr. Johnston,*

> Gathering into its stores the genius and information of every district, awakening men, wherever it bends its footsteps, to the dignity and importance of science, and scattering into every corner, as it passes through the land, some new seeds of valuable discovery, and which, duly fostered, may ripen into a harvest of resources hitherto not known, and therefore undeveloped,—an institution, which, limited to no science, can comprehend, within its ample bounds, the votaries of every branch of knowledge, ready each, and willing to eliminate, by the conjoint researches of all, those complicated mysteries of nature which the most ardent philosophers are ever meeting within their single and isolated investigations, and which even the united efforts of all the cultivators of any one department could never have revealed.

There has been a great deal said about the march of intellect, which has almost become a bye-word, because of the misdirection which some have sought to give to those powers of reasoning which all men, more or less, possess. This will always be the case, where the knowledge of words, rather than that of things, receives an intellectual consideration, due only to that kind of knowledge, which is inseparable from a sound judgment. Amidst all the extravagances of this *siècle de mouvement*—we use the term on account of the appropriateness of the language, and not from an inclination to write French for English readers—we see an ultimate regenerating principle for society, in the increasing inclination for the study of nature. All her phenomena are produced by invariable laws, and such are the plastic powers of the human mind, that the habit of considering the relations of physical things, is gradually adopted by us, for the consideration of moral things; and as we find out that we cannot imitate nature, but by the application of her unchanging ways, so neither can we follow up the moral laws of the Author of nature, but by the aid of his immutable principles of truth and justice. We think that the love and study of nature, will eventually subdue

* Brewster, Jan. 1832, p. 1.

the disposition among men, to be estranged from her. If men are ever intended to be just to each other, the consummation of that great purpose will be produced in this way. Our gratitude then, is pre-eminently due to men who devote their highest powers to this lofty end.

This sentiment appears to be growing up in Great Britain. The propriety of representing, in a reformed parliament, the *intelligence*, as well as the property and *ignorance* of the country, is a subject which has received some discussion there; and it is said that the ministers have even admitted the *necessity* of it. We do not see why the presidents of a few learned societies, might not, ex officio, have seats in parliament, with the privilege of speaking, if not of voting. We feel quite sure that the president of the Geological Society of London, would be more useful there, representing the saurians of the lias, than Mr. Hunt, representing the mammalia of Preston in Lancashire.

METEOROLOGICAL OBSERVATIONS.

Made at Wilmington, Delaware, by Henry Gibbons, M. D.

SUMMARY FOR FEBRUARY, 1832.

	Therm.	*Barom.*
Average at sun-rise,	30°.14	*in.* 29.90
Average at mid-day,	38°.45	29.86
Average at 11 o'clock, P. M.	32°.93	29.86
Monthly average,	34°.295	29.885
Maximum, 19th,	62°.	24th, 30.38
Mimimum, 24th,	12°.	20th, 29.45
Range,	50°.	.93
Warmest day, 19th,	55°.	
Coldest day, 24th,	15°	

Proportion of clear weather,	*days* 9
Proportion of cloudy,	20
Whole days clear,	5
Days on which snow and hail fell,	5
Days on which rain fell,	8
Depth of snow,	*in.* 4
Depth of rain,	5.10
Quantity of water,	5.60
Northerly winds prevailed,	*days* 12
Easterly,	8
Southerly, (S. to W.)	9

No Auroras.—Clouds electrified, once.—Rains, frequent, though light; and several small snows.—Winds moderate, and rather changeable.—Two easterly storms, both attended with hail, sleet, and rain; also a partial one, with some snow, the wind changing in a short time to south. The weather of this month was very disagreeable, being a succession of transitions from warm to cold, with frequent rain and snow. The temperature was at no time cold enough to impede the navigation by forming ice. On three days only was the mercury so low as 20°, viz. on the 21st, 22d, and 24th.

Fig 1.

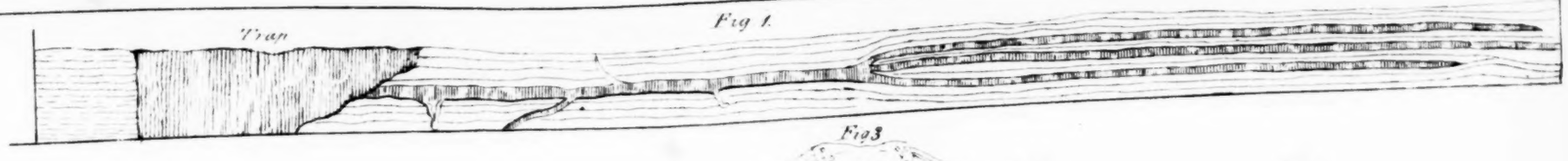

Fig 2

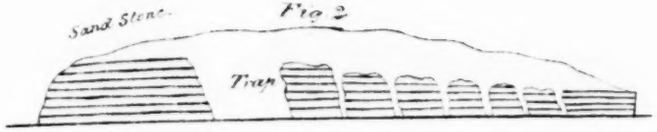

Fig 3

Fig 4

Fig 5

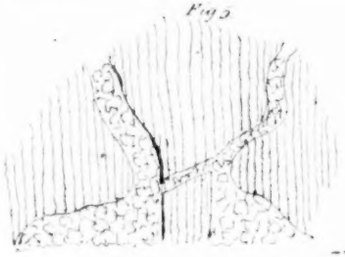

Fig 6

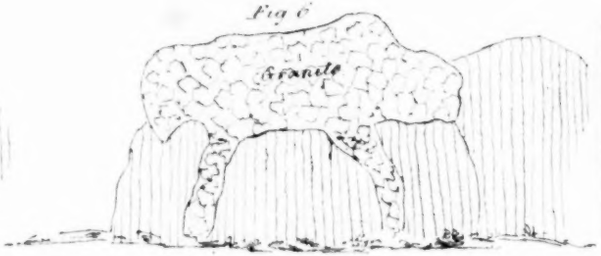

Fig 7

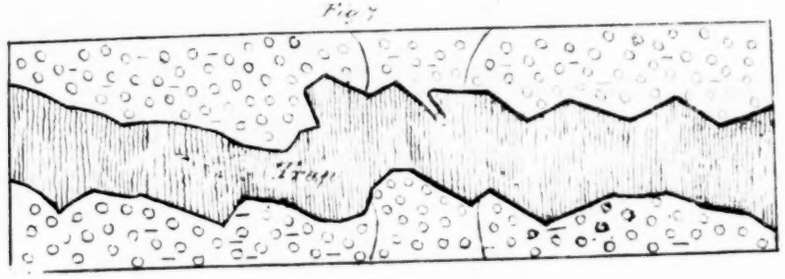

Fig 8

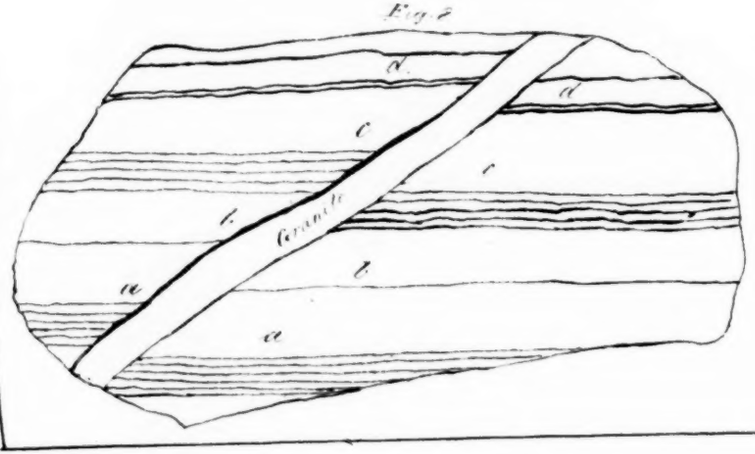

Fig 9